SOUTH NEW BRIGHTON AND SOUTHSHORE FACT SHEET

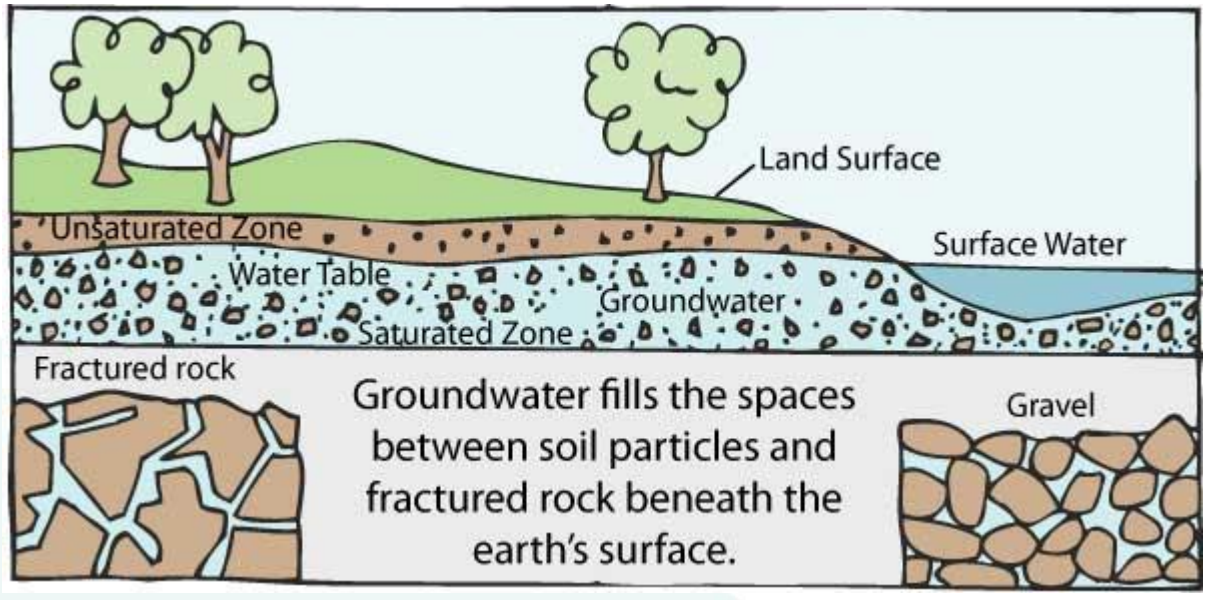
GROUNDWATER ISSUES

This Fact Sheet is about changes to groundwater in Southshore and South New Brighton due to the 2010/11 earthquakes. It provides supporting information for the Southshore South New Brighton Earthquake Legacy Issues Project.

This information is not about groundwater changes due to climate change. Rising sea levels will raise the groundwater in areas affected by the tides. The Tonkin and Taylor report *Effects of Sea Level Rise for Christchurch* includes information about the impact of climate change and rising sea levels on groundwater.

Groundwater explained

Groundwater is water that exists underground in saturated zones beneath the land surface. The top of the groundwater is called the water table. When closer to the coast, the water table level fluctuates with the level of the sea. The diagram below is a groundwater cross-section:



Groundwater cross-section. Source: The Groundwater Foundation – www.groundwater.org

Shallow groundwater is groundwater that is closer to the surface. Groundwater next to the coast is affected by tides. On high tide, water from the sea can soak into the water table, making the groundwater temporarily closer to the surface.

The impact of the earthquakes on groundwater in Southshore and South New Brighton

The groundwater level in Brighton Spit is generally shallower now than before the earthquakes. This is because the earthquakes caused the land to drop in some places, particularly on the estuary side of South New Brighton. In most parts of Southshore the earthquakes lifted the land so the groundwater level is generally deeper than, or close to, its pre-earthquake levels.

Ground levels in Christchurch continue to adjust to the 2010/11 Canterbury earthquakes and other subsequent earthquakes (including the Kaikōura earthquake). This could mean groundwater become closer to the surface in some areas than it is now.

The impacts of shallow groundwater on people and places

On homes and gardens

Shallow groundwater can affect homes and gardens. The image below illustrates the range of potential negative impacts of shallow groundwater on people and property. Some South New Brighton residents report concern about the flooding caused by the interaction of high tides and shallow groundwater.

Groundwater and surface flooding

Shallow groundwater is also likely to worsen the effects of flooding when it rains, especially when heavy rain and a high tide occur at the same time, as the soil has less capacity to absorb rainwater. Soils that have been subject to liquefaction are also less porous. More rain will run off the ground and into the stormwater network which may not be able to cope with the additional volume of water.

Much of Christchurch has shallow groundwater and can experience these impacts. However, as Southshore and South New Brighton are close to the coast, tides add a twice daily peak in groundwater levels.

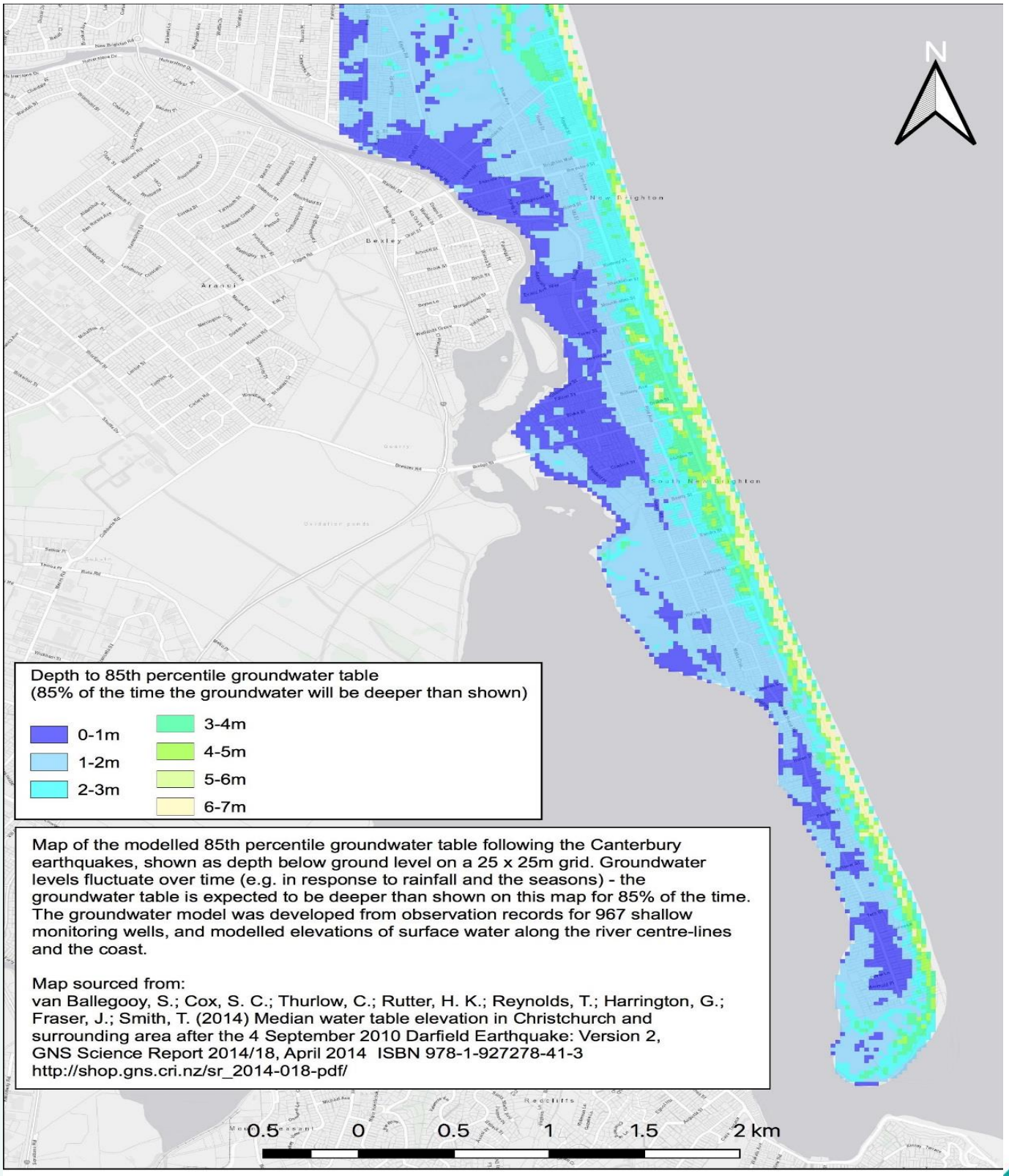
Groundwater levels in Southshore and South New Brighton

As shown in the map on the next page, areas adjacent to the estuary edge north of South New Brighton Park and along Rocking Horse Road in Southshore have the shallowest groundwater at less than one metre below the ground surface.

What the Council is doing about shallow groundwater

The Council does not intentionally pump or drain shallow groundwater anywhere in Christchurch. However, this sometimes happens as part of other Council drainage work.

The Council is working with Environment Canterbury to make more information publicly available about shallow groundwater throughout Christchurch. This will help agencies monitor changes over time against a baseline of groundwater levels.



Depth to groundwater table, based on 85th percentile (average peak levels). (van Ballegooy, et al., 2014)

Other Southshore and South New Brighton Fact Sheets

The Southshore and South New Brighton Fact Sheet series cover a range of issues:

Fact Sheet title	What it covers
Flooding	Why the Canterbury earthquakes have led to increased flooding risk in Southshore and South New Brighton.
Groundwater	What groundwater is and why it causes issues in Southshore and South New Brighton.
Stormwater	What stormwater is and why it causes issues in Southshore and South New Brighton.
Planning and approvals	How the planning and approvals process can impact the timing, cost and requirements for options in this area.
Christchurch drainage datum and levels	What the Christchurch drainage datum is, and how we use it and other levels in our planning.
2018 new high tide statistics	Information on the record high tides experienced in Christchurch coastal areas and the 2018 review and update of tidal statistics which has occurred following these events.
Stopbanks, bunds and other structures	Explanations of some of the different structures that can be used for flood and erosion mitigation.
What is a 1 in 100 year flood?	How we describe the probability of flooding.